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09/620,779	07/21/2000	Behrooz Rezvani	VELCP001	4002

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Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/25/2001*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-22* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-7,9,10,12,13 and 15-22* is/are rejected.

7)☒ Claim(s) *8,11 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date *3 and 8*.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

Detailed Action

Drawings

1.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: element 202 in line 32 of page 7 is not included Fig. 3. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: element 260 in Fig. 2, elements 104, 106, 120, 122, 132, 134, 140, 362 in Fig. 3, elements 600, 616, 622 in Fig. 6A. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3.   Figs. 8A and 8B labels mentioned on pages 15-17 of the specification are missing in the drawings.

4.   There are numerous errors found in the drawings. In addition to the objections made by the Examiner above, it is best to the applicant to review all drawings in all figures to make sure each of the element reference numerals in each figure refers to a corresponding reference numeral in the appropriate paragraph of the specification.

Specification

5.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract is objected to by the Examiner because the abstract exceeds 150 words in length, and the legal phraseology term "said" is used in lines 16, 18, 19, 20, 22, 23, 24 of the abstract. Appropriate action is required.

In addition, the abstract is further objected to by the Examiner because the page heading of the abstract page should only be "Abstract" and not the title of the applicant's invention.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6.   **Claims 3-6, 12, 18-22** are rejected under 35 U.S.C. 102(e) as being anticipated by

Bremer et al. (US Patent 6,580,785).

Regarding claim 3, Bremer discloses an apparatus for distributed XDSL

communication of data (**CO wire center multichannel data communications device**

modem, see lines 1-2, col. 6 and element 13, Fig. 3A) between a network (**Internet**, see

element 24, Fig. 2) and subscribers (see elements 43, 46, Fig. 2) coupled to

corresponding subscriber lines (**subscriber loop**, see lines 1-4, col. 5 and element 27,

Fig. 2), and the apparatus (**CO wire center multichannel data communications device**

modem, see lines 1-2, col. 6 and element 13, Fig. 3A) comprising:

at least one analog front end (AFE) (see elements 34, Fig. 3A) coupled to at least

one of the subscriber lines (see element 27, Fig. 3A) and the at least one AFE (**analog**

front end logic, see element 34, Fig. 3A) for converting analog communications from the

at least one subscriber line to a corresponding upstream channel of digitized data (**analog**

front end logic 34 converts the analog signal to a digital signal), and for converting a

corresponding downstream channel of digitized data into analog communications to the

at least one of the subscriber lines (**AFE is connected to a communication link which is**

connected to a driver where the driver digital-to-analog converter converts digital

signal into analog signal, see lines 40-51, col. 6);

at least one digital signal processor (DSP) (**DSP Logic**, see element 35, Fig. 3A)

coupled to a network (**Internet**, see element 24, Fig. 2) and the at least one DSP (DSP

Logic, see element 35, Fig. 3A) for processing downstream channels of data from the ·

network (**Internet**, see element 24, Fig. 2) to the subscribers (see elements 43, 46, Fig. 2)

and for processing upstream channels of digitized data from the subscribers to the

network (**DSP reconstructs the digital signal streams into usable digital data y** ·

stripping error control information, see lines 66-67, col. 6); and

I/O interfaces (**receiver and driver**, see lines 40-51, col. 6; note that each AFE is

connected to a receiver and a driver) coupled to each other (**coupled through the AFE,**

see element 410, Fig. 2) and each of said I/O interfaces coupled to a corresponding one of

the at least one AFE (**AFE is connected to a receiver**, see AFE, see lines 40-51, col. 6)

and DSP (**AFE is connected to a driver**, see lines 40-51, col. 6), and the I/O interfaces

(**receiver and driver**, see lines 40-51, col. 6; note that each AFE is connected to a

receiver and a driver) for converting digitized data between the at least one DSP (**DSP**

Logic, see element 35, Fig. 3A) and AFE (**AFE Logic**, see element 34, Fig. 3A) into

upstream and downstream packets with headers (**Address Header**, see element 103, Fig.

6) for correlating each upstream and downstream packet both with a communication

channel (**communication link**, see line 42, col. 6) and with a targeted one of the at least

one DSP (see element 35, Fig. 3A) and the at least one AFE (see element 34, Fig. 3A).

Regarding claim 4, Bremer discloses the apparatus (**CO wire center**

multichannel data communications device modem, see lines 1-2, col. 6 and element

13, Fig. 3A) of claim 3, wherein the I/O interfaces (**receiver and driver**, see lines 40-51,

col. 6; note that each AFE is connected to a receiver and a driver) couple to one another

via at least one of at least one packet based bus (**couple to LAN**, see element 29, Fig. 2)

and at least one packet based network (**couple to Internet**, see element 24, Fig. 2).

Regarding claim 5, Bremer discloses the apparatus (**CO wire center**

multichannel data communications device modem, see lines 1-2, col. 6 and element

13, Fig. 3A) of claim 3, further comprising:

a bi-directional bus (**bi-directional digital communication link connected to**

both the receiver and the driver, see lines 48-51, col. 6), coupling the at least one AFE

(**AFE is connected to a communication link**, see element 34, Fig. 3A) to the at least one

DSP (**communication link is connected to the receiver that converts analog signals to**

digital signals which are then transmitted to DSP Logic, see lines 40-51, 54-55, col. 6
and element 35, Fig. 3A) via the corresponding I/O interfaces (connected to both the
receiver and the driver, see lines 40-51, col. 6; note that each AFE is connected to a
receiver and a driver) for the transport of upstream and downstream packets.

Regarding claim 6, Bremer discloses the apparatus (CO wire center
multichannel data communications device modem, see lines 1-2, col. 6 and element
13, Fig. 3A) of claim 3, wherein the at least one AFE includes:

at least a first AFE (see element 34, Fig. 3A) coupled to a first set of the
subscriber lines (see element 27, Fig. 3A) supporting a first set of communication
channels (communication links, see lines 40-41, col. 6).

Regarding claim 12, Bremer discloses the apparatus (CO wire center
multichannel data communications device modem, see lines 1-2, col. 6 and element
13, Fig. 3A) of claim 6, further comprising:

a packet based bus (LAN, see element 29, Fig. 2) coupling the I/O interfaces
(connected to both the receiver and the driver, see lines 40-51, col. 6; note that each
AFE is connected to a receiver and a driver) of the at least first AFE (see element 34, Fig.
3A) and the at least one DSP (see element 35, Fig. 3A) with one another for the transport
of the upstream and downstream packets (see lines 12-14, col. 8 and Fig. 6); and

the at least one DSP (see element 35, Fig. 3A) further regulating the transport of
upstream and downstream packets on the bus (LAN, see element 29, Fig. 2) to
correspond with the bandwidth requirements (DSP reconstructs the digital signal
streams into usable digital data by data compression, see lines 59-64, col. 5) for each

channel within the first set of channels (**each communication link**, see lines 40-55, col.

6).

Regarding claims 18 & 21, Bremer discloses a method for distributed XDSL

communication of data (**CO wire center multichannel data communications device**

modem, see lines 1-2, col. 6 and element 13, Fig. 3A) between a network (Internet, see

element 24, Fig. 2) and subscribers coupled to corresponding subscriber lines (see

elements 27, 43, 46, Fig. 2), and the means to perform the method comprising:

converting analog communications from the at least one subscriber line (**see**

subscriber line going into AFE, Fig. 3A) to a corresponding upstream channel of

digitized data (**AFE is connected to a receiver that converts analog signals to digital**

signals, see lines 40-45, col. 6), and a corresponding downstream channel of digitized

data into analog communications to the at least one of the subscriber lines (**a driver**

digital-to-analog converter converts digital signals to analog signals, see lines 49-51,

col. 6);

processing downstream channels of data from the network (**Internet**, see element

24, Fig. 2) to the subscribers (see elements 43, 46, Fig. 2) and upstream channels of

digitized data from the subscribers to the network (**AFE logic transmits the digital**

signal to the DSP logic and reconstructs the digital signal streams into usable digital

data by stripping error control information, see lines 54-55, 66-67, col. 6); and

packetizing the digitized data into upstream and downstream packets (**a**

communication packet transported by the modem 50, see lines 12-14, col. 8) with

headers (**Address Header**, see element 103, Fig. 6) for correlating each upstream and

downstream packet (see lines 60-62, col. 2, and element 101, Fig. 6) both with a

communication channel (**communication link**, see line 42, col. 6) and with a targeted

one of the converting (**a driver digital-to-analog converter converts digital signals to**

analog signals, see lines 49-51, col. 6) and processing acts (**DSP digital data**

reconstruction, see lines 54-55, 66-67, col. 6).

Regarding claim 19, Bremer discloses the method of claim 18, further

comprising:

pipelining the conversion between analog communications and digitized data in

said converting act to concurrently subject to various stages of conversion upstream and

downstream packets (see lines 40-51, col. 6) corresponding with a plurality of XDSL line

codes and/or protocols (see lines 42-50, col. 8).

Regarding claim 20, Bremer discloses the method of claim 18, further

comprising:

pipelining the processing in said processing act to concurrently subject to various

stages of conversion upstream and downstream packets (see lines 54-55, 66-67, col. 6 and

line 1, col. 7)corresponding with a plurality of XDSL line codes and/or protocols (see

lines 42-50, col. 8).

Regarding claim 22, Bremer discloses the means for distributed XDSL

communications of claim 21, further comprising:

means for pipelining (**CO wire center multichannel data communications**

device modem, see lines 1-2, col. 6 and element 13, Fig. 3A) at least one of the means

for converting (AFE, see lines 40-51, col. 6 and element 34, Fig. 3A) and the means for

processing to concurrently convert or process packets (DSP, see lines 55-56, 66-67, col.

6, line 1, col. 7, and element 35, Fig. 3A) corresponding with a plurality of XDSL line

codes and/or protocols (see lines 42-50, col. 8).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

7.   **Claims 7, 9-10, 13, 15-17** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Bremer in view of Mukherjee (US Patent 6,226,322).

Regarding claims 7, 13, 16, 17, Bremer discloses all the aspects of the claimed

invention set forth in the rejection of claims 6 and 3, respectively, except fails to

explicitly show the apparatus of claims 6 and 3, respectively, wherein the at least a first

AFE further comprises:

a plurality of modules coupled to one another to form both a transmit path for

packetized conversion of data packets corresponding with downstream channels of data

from the network into analog communications and a receive path for converting analog

communications from the subscribers to data packets corresponding with upstream

channels of data from the subscribers; and

buffers between selected ones of the plurality of modules of the transmit path and

the receive path for buffering downstream and upstream data packets to allow pipelined

processing by selected ones of the plurality of modules on the transmit path and receive

path of successive downstream and upstream data packets.

However, Mukherjee discloses a AFE which comprises a plurality of modules coupled to one another to form a transmit path for conversion of data packets flowing downstream from the network into analog communications (see modules going from 12 to 46C, 48C, 50C, 52C and finally to land driver 14 in the AFE component structure, Fig. 4), and a receive path for converting analog communications from the subscribers to data packets corresponding to the upstream channels of data (see modules going from 56 to 54C, 58C, 60C, 62C, 64C, and finally to Digital Transceiver, Fig. 4). Mukherjee further discloses a 16-bit parallel interface with edge-triggered read and write strobe inputs (buffers) for controlling reading data from and writing data to (see element 42, Fig. 4; note that element 42 is interpreted as the one to buffer downstream and upstream data packets to allow processing by DAC and ADC in the transmit path and receive path of the pipeline in AFE). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to combine the AFE of Bremer with that of Mukherjee such that the AFE is shown to provide buffers for upstream and downstream flow of data packets and modules to converting digital data packets into analog communications and vice versa, such as the internal modules and functions of AFE taught by Mukherjee. The motivation to do so is to show provide digital-to-analog data conversion in the transmit path and analog-to-digital conversion in the receive path because AFE is an essential component in a DSL modem that allows the provisioning of greater data rates than conventional voice modems.

Regarding claim 9, Bremer and Mukherjee disclose all the aspects of the claimed invention set forth in the rejection of claim 7 above. Bremer fails to explicitly show that

at least a corresponding one of the plurality of modules of the at least a first AFE

includes:

an interpolator module on the transmit path which upsamples the downstream

data packets in amounts which correspond with each associated downstream channel; and

a decimator on the receive path which decimates the upstream data packets in

amounts which correspond with associated upstream channel.

However, Mukherjee discloses the internal modules of AFE which comprises an

interpolator filter for increasing the sample rate (see lines 27-28, col. 12 and element 70,

Fig. 5), and a decimation filter for reducing the sample rate (see lines 28-39, col. 21 and

element 92, Fig. 9).

Therefore, it would have been obvious to one ordinary skill in the art at the time

the invention was made to combine the AFE of Bremer with that of Mukherjee such that

the AFE of Bremer is shown to comprise a interpolation filter and a decimation filter

such as the interpolation and decimation filters of AFE taught by Mukherjee. The

motivation to do so is to provide an interpolation filter to increase the sample rates of the

digital data to be transmitted because it would allow the downstream analog low pass

filters to be realized with relatively simple, low-order filters, and to provide a decimation

filter to reduce the sample rates of the digital data to be transmitted because it would

allow the upstream digital low pass filter to be realized with greatly reduced complexity.

Regarding claims 10 & 15, Bremer and Mukherjee disclose all the aspects of the

claimed invention set forth in the rejection of claims 7 and 13, respectively. Bremer fails

to explicitly show that the at least first AFE further comprises:

registers associated with selected modules on the transmit path and receive path

for storing control parameters downloaded from the at least one DSP for each of the

downstream and upstream channels; and

selected ones of the plurality of modules on the transmit path and receive path

responsive to the control parameters stored in associated ones of the registers to vary the

processing of corresponding ones of the upstream and downstream data channels.

However, Mukherjee discloses an interface and control function in AFE (AFE

comprises Digital Filters 46C and 64C in Fig. 4, which are DSP), which includes

multiplex control registers for storing control words that set the state of various control

functions in AFE (see lines 33-40, col. 11). Therefore, it would have been obvious to one

ordinary skill in the art at the time the invention was made to combine the AFE of

Bremer with that of Mukherjee such that the AFE of Bremer is shown to comprise an

interface and control function such as the one taught by Mukherjee. The motivation to do

so is to store clock circuitry control information because it would provide clock control

for synchronous operation.

Allowable Subject Matter

8.   Claims 8, 11, 14 are objected to as being dependent upon a rejected base claim,

but would be allowable if rewritten in independent form including all of the limitations of

the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject

matter:

In claim 8, the apparatus of claim 7, wherein selected successive packets within

the transmit path and receive path pipelines of the at least a first AFE, exhibit different

XDSL protocols and/or line codes; and

wherein further selected ones of the plurality of modules vary the processing of

each of the selected successive packets to correspond with the corresponding XDSL

protocol and line code.

In claim 11, the apparatus of claim 6, wherein the at least one DSP further

comprises:

a first DSP and a second DSP each coupled to the network and coupled via

corresponding I/O interfaces with the at least first AFE; and the first and second DSP

forming a logical DSP server for the at least first AFE.

In claim 14, the apparatus of claim 13, wherein selected successive packets within

the transmit path and receive path pipelines of the at least a first AFE, exhibit different

XDSL protocols and/or line codes; and

wherein further selected ones of the plurality of modules vary the processing of

each of the selected successive packets to correspond with the corresponding XDSL

protocol and line code.

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure with respect to method and apparatus for XDSL packet based

communication.

US Patent 6,421,796 to Gatherer

US Patent 6,351,487 to Lu et al.

US Patent 6,281,829 to Amrany et al.

US Patent 6,345,072 to Liu et al.

US Publication 2002/0080869 to Young et al.

US Publication 2002/0061061 to Young et al.

10.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Kevin Mew whose telephone number is 703-305-5300.

The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ricky Ngo can be reached on 703-305-4798. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free).

KDM
Art Unit 2664   **RICKY NGO**
                                        PRIMARY EXAMINER